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ART. I.—FAITH AND SCIENCE—COMTE'S POSITIVE PHILOSOPHY.

[SECOND PAPER.]

Cours de Philosophie Positive. Par M. Auguste Comte, Ancien Elève de l'Ecole Polytechnique ; Répétiteur d'Analyse Transcendentale, et de Mécanique Rationnelle à la dite Ecole. Paris : Bachelier. 1830–1842. 6 tomes, 8vo.

THE fallacy involved in M. Comte's distribution of states and periods consists, in great measure, in mistaking a predominant characteristic for a specific difference, and hence in supposing them to be reciprocally exclusive of each other. It would, indeed, be doing injustice to M. Comte, which we are very far from having any disposition to do, to conceal his recognition of the actual co-existence of all, which is prominently and continually brought forward in the whole course of his elaborate work. But this admission recognises them merely in their antagonism, which is supposed to lead to an ultimate exclusion, and therefore we are perfectly correct in saying that, on his theory, they are logically exclusive of each other. It may seem strange that a doctrine, leading to such a result, should have been deliberately embraced by one who regards the theological habit of mind as spontaneous,* whence it should have been acknowledged as indestructible also; and who professes to have systematized and proclaimed the historical method, which ought to recognise as also indestructible, though not as incapable of restriction, all tendencies which have been characteristically manifested at any period of the progress of humanity. But it is not with these things, but with the consequences to which they lead, that we are principally concerned at present.

* “Le développement spontané des conceptions théologiques.” Philos. Posit., leçon i, tome i, p. 9.

If these intellectual conditions are severally exclusive of each other, then the attainment of the Positive habit of mind must be a negation and complete overthrow of the Theological and Metaphysical; or, in plain language, such as M. Comte delights to use, Science is entirely incompatible with Religion and Metaphysics,* and the acceptance of the Positive Philosophy is the rejection of both. As we have shown briefly that this supposed exclusion is fallacious, we might here arrest our argument, for the presumption is at least in favour of the possible co-existence of Science, Metaphysics, and Religion, and we might wait till M. Comte had altered or modified his premises, and replaced the defective threads of his Logic. But as he unequivocally cashiers Logic altogether, we will proceed with our refutation by showing that not merely are his premises false, but his conclusions and their consequences erroneous. We do not mean to say that they are inconsistent with such incorrect premises, for the logical concatenation of the Positive Philosophy is almost without flaw, and constitutes one of its most admirable characteristics; but they are at variance with the truth.

We will again wave the discussion of M. Comte's irreligion, remarking only that there is a gross inconsistency in this abnegation of the validity of a belief which is attested as one of the fundamental facts of human nature by the whole course of that history on which his whole philosophy is erected, and which is confirmed by the universal experience and observation on which he relies as the instruments by which science is established. Nay more: so absolutely impossible is it to escape from the recognition and influence of this necessary belief, that even M. Comte himself, undoubting and total as is his infidelity in respect to all revealed or accredited religion, concludes his long labours by appending to them as a corollary a proposition for the institution of a new creed and a new worship, of which the divinity shall be an idealized humanity.†

We are in no danger of being supposed to argue from a prejudiced point of view—at any rate the argument will not be suspected of springing from a foregone conclusion—when we discuss M. Comte's rejection of Metaphysics; and on this subject, therefore, we shall venture to dwell at greater length, inasmuch as its repudiation arises from the same principles which have led to the abnegation of religion, and involves fallacies strikingly analogous to those which are connected with the rejection of Theology.

* "La théologie et la physique sont si profondément incompatibles." *Philos. Pos., leçon i, tome i, p. 13; leçon lvii, tome vi, pp. 551, 552; leçon lviii, p. 714; et passim.*

† *République Occidentale, Conclusion Générale*, pp. 315–393.

It is generally conceived that Logic and Metaphysics are two distinct branches of moral science: but this position is not now, and never has been of universal acceptance; for sometimes Metaphysics has been regarded as a part of Logic, and more frequently Logic has been treated as a mere application of Metaphysics. The Scotch school has included all the Logic which it recognises in their narrow Psychology, while the Scholastics and many others, ourselves among the number, are disposed to comprehend within the range of Logic whatever can be distinctly known of Metaphysics. It does not fall within our province at this time to discuss which of these opinions is correct,—whether they constitute one or two sciences. M. Comte rejects both, and while we concede the propriety of this double rejection as a single and immediate consequence of that distribution of the states of mind which we have just animadverted on, we will consider the propriety of the abrogation of each, separately and distinctly.

It might still be a question whether the one or the other should have the precedence in this discussion; and a very important question it would be, if we intended to make the validity of either dependent upon the other. But, inasmuch as Metaphysics in its loose acceptation contemplates a larger scope than is ordinarily comprehended by Logic; and inasmuch as M. Comte's rejection of Metaphysics is absolute, while with regard to Logic he rather proposes to discard the term than the reality, and to substitute another Organon for the Aristotelian Logic, we shall first consider his grounds for the denial of Metaphysics and their validity, and then prosecute a similar inquiry in regard to his dethronement of Logic.

We have seen that the rejection of Metaphysics follows immediately from the principles of the Positive Philosophy as expounded by M. Comte; but he further objects to its claims to be regarded as a branch of knowledge, that it is a resuscitation of a defunct theology, that it is purely critical, meaning thereby that it only criticises other systems and is only adapted to a crisis or transition-stage of intellectual progress, that it has proved wholly unfruitful for two thousand years, that it can boast of no real discoveries, that its whole substance is a patch-work of imperfectly comprehended metaphors mistaken for reasoning, and that, when it attempts to place itself on the same platform with the other modern sciences, by supposing a distinction between internal and external observation, and thereon constructing a psychology, it makes only a futile effort.* In connexion with the last objection, he asks with more acuteness than ingenuity, How can any observation take place, when the organ ob-

* Cours de Phil. Pos., leçon i, tome i, pp. 34–38.

served and the organ observing are identical? But, however conclusive such an inquiry might be if addressed by or to a philosopher who rigidly adhered to the old Aristotelian maxim, "*vere scire est per causas scire*,"* it comes with a bad grace from one whose fundamental maxim is that the "*quid*," the fact or phenomenon, can alone be known,† and that the "*quomodo*," or manner—the how—lies absolutely beyond human cognition. Nor is the question of any weight with those who admit this maxim in metaphysics as in other science, and attempt to give to its shadowy doctrines, as much as possible, a scientific or *positive* form. In our day few metaphysicians pretend to trace causation—"scire per causas :" the impossibility of such knowledge has been recognised in great measure, not in consequence of its promulgation by the Positive Philosophy, but in consequence of the difficulties which were shown to attend it by the metaphysicians Hume and Brown. We have not inserted in these objections M. Comte's opposition to metaphysics in consequence of its supposition of entities, in part because we have shown this to be characteristic merely of one form of ontology, not of all, and in part because it is connected with the religious part of the inquiry, since M. Comte regards God as only a metaphysical entity.

Let us now examine briefly and separately M. Comte's objections. They present a strong array of charges, we will not affect to disguise it, and they contain much truth in them, but they have been alleged by other philosophers, themselves metaphysicians, not as destructive of this branch of knowledge, or conclusive against its existence, but as evidence of the inherent difficulty of the subject, and of the necessity for cautious and careful reconstruction.

We pass over once more the theological objection, and address ourselves to the charge of Metaphysics being purely critical. If we regard this accusation as meaning that it merely criticises other philosophies, it might have been suggested by a loose apprehension of the significance of Kant's great work; but, in all probability, it is original with M. Comte, as a transition-state of intellect can have no independent philosophy of its own,—the very idea of an intellectual crisis or transition supposing a merely provisional body of doctrine to bridge over the chasm which separates one original or normal (we cannot avoid using the expression) system from the other. If we consider the accusation as implying that Meta-

* πάντες γὰρ τὴν σοφίαν τῶν ἀρχῶν καὶ τῶν αἰτιῶν φαῖν εἶναι γνῶσιν. Alex. Aphrod. Schol. Aristot., p. 525.

† ἀρχὴ γὰρ τὸ δτι· καὶ εἰ τοῦτο φαίνοιτο ἀρκούντως, οὐδὲν προσδεήσει τὸ διότι. Aristot. Eth. Nicom., lib. i, c. ii, p. 1095, b. 6.; sed contra Metaph. lib. i, c. l, p. 981, a. 29. It is still more applicable to the πῶς.

physical science is characteristic of a crisis, we may ask in what respects it is so. It cannot be in all respects, for it has existed in all ages since the march of intellect commenced. It was born and very acutely developed under the Polytheism of Greece, which M. Comte considers only one or two removes from Fetishism; it was found in company with the mythology of the Hindoos; it grew up with the extension and development of Christianity. But if it thus accompanied all forms of Theology but the first, it has existed concurrently with the earlier stages of the Positive Philosophy, and may continue to co-exist with its further progress; and M. Comte himself regards as one of the originators of that Philosophy, which he supposes to be final and exclusive, that very Descartes,* who is universally reverenced as the father of modern Metaphysics. The truth is that a metaphysical doctrine is not necessarily transitional, except inasmuch as all change is a transition; but a transitional state is necessarily metaphysical. The difference may be in appearance only verbal, but it is nevertheless one of vast importance. During a period of transition, Metaphysics encroaches upon the domain of both Theology and Science, and retains its command of them till the one has been established and the other reconstructed. It extends its sway at such a time beyond its legitimate kingdom; but it possesses a lawful sovereignty within which it is afterwards restricted. Its usurpations alone are peculiarly connected with a transitional state; its peculiar and just reign is eternal. We think that the vagueness of M. Comte's conception of Metaphysics, and his application of the epithet, Metaphysical, to a crisis in intellectual development, have sprung very much from his recognition of the predominance in our day of both the Metaphysical and the critical spirit, and a hasty induction therefrom. Now we acknowledge most freely that this is an age of criticism,—it has long been asserted by metaphysicians;† we admit that it is also an age of transition; and we have already confessed that an era of transition is necessarily metaphysical, (the reasons for which opinion we may hereafter have an opportunity of alleging;) but we cannot assent to the position that Metaphysics belongs only to a crisis, and is nothing but a criticism. How far it is essentially critical; why it is so far critical; and what is its independent or positive value, we shall endeavour to explain after replying to M. Comte's other objections.

M. Comte further charges upon Metaphysics its utter barrenness for two thousand years, and its inability to point to any real dis-

* Cours de Phil. Pos., tome vi, pp. 455, 695, 756, 886.

† "Notre siècle est le siècle de la critique: tout doit y être soumis." Kant. Crit. de la Raison Pure, vol. i, p. 7, note, trad. Tissot; and Logique, § iv, p. 42.

coveries. This count in the indictment is rendered still more grave by its being, in some measure, supported by the high authority of Kant.* We will examine its validity as an objection, supposing it to be true; and then estimate its truth.

The period of infertility assigned by M. Comte makes us conjecture that he regards it as extending from the times of Aristotle to our own. This seems to admit that it had been fruitful previous to that time; and, if so, then, although it may have early attained its highest possible development, and may have been thenceforward stagnant, yet it must have been a valid branch of knowledge before, and at the time of its maturity, and must have possessed some value. Whatever value it then had, it must still possess, except so far as the same purposes are better subserved by some other philosophy, unless its whole scope is embraced in other science, which will not be pretended. Certainly, if M. Comte recognises its value or utility at any time, which he does distinctly on numerous occasions, its incapability of further advancement does not destroy that validity or authorize him to deny it at a future time. We may venture to say that Arithmetic is a constituted science, *tota, teres, et rotunda*, admitting no further development worthy of consideration, and already in great measure supplanted by Algebra. Yet no one, not even M. Comte himself, will presume to deny either the existence or the value of such a branch of knowledge as Arithmetic. We may also allege that Moral Philosophy has certainly made even fewer notable advances, as a purely human science, than Metaphysics since the Ethics of Aristotle and the Offices of Cicero; yet M. Comte professes his belief in the validity and existence of such a philosophy, though he would alter and amend it, and re-organize it on a new basis. Metaphysics may, in like manner, require a new basis, and may have been so long barren for want of it; but we have assuredly no right to conclude from its long failure to advance that it may not resume its progress at some future time. The science of Astronomy was almost retrograde for fourteen hundred years from Ptolemy to Copernicus, and did not in consequence prove ultimately to be either futile or barren.† Consequently, even if Metaphysics be all that it is represented to be in this unfavourable picture, its stagnant condition would not furnish in the slightest respect a reason for its entire negation.

But, notwithstanding the allegations of M. Comte, and their partial confirmation by Kant, we deny that Metaphysics has been stagnant.

* Crit. de la Raison Pure, préface de la seconde édition, vol. i, p. 331.

† By some such reasoning Kant appears to have satisfied himself with regard to the doubt which he had suggested. Crit. de la Raison Pure, vol. i, p. 332.

The facts of which it takes cognizance are almost entirely facts of internal consciousness. These are its data, and they have always been equally possessed by all ages and classes of men. No mechanic arts, no curious instruments are requisite for their apprehension; they cannot be multiplied by the advancement of science, nor enlarged by any process of invention. All that can be done is to observe them more clearly, to harmonize and explain them more accurately and consistently, and to detect their mutual relations and dependence more precisely. The subject-matter, then, of Metaphysics, once determined with any degree of completeness, remains thenceforward incapable of any considerable expansion, except when the science transcends its domain. Hence, as the territory of the science does not enlarge it appears to be stagnant—nay, as it usurps ground in its earlier stages which does not rightfully belong to it, and which it must ultimately surrender, it may appear to recede. But production may be increased by cultivation as well as by an extension of the area—the power and the action may equally exist when concentrated, as when they were diffused. And such, we think, has been the case. But, again, a new source of delusion is opened. The fruitfulness of Metaphysics consists in the clearer determination of common notions and first principles; and the moment this greater perspicuity is attained, the man of science and the politician, the philosopher and the crowd, all avail themselves of the conquest; it is received and absorbed by the general intellect of the current and succeeding ages, and all forget the instrument by which it has been achieved, and deny the claims of the benefactress to their gratitude. Yet it might be easy to show that every intellectual reformation had been heralded, facilitated, or effected by a preceding improvement in the very Metaphysics which is so spitefully entreated. If even, then, it could not now point to any real discoveries which would be generally credited to it, nevertheless it might have rendered most essential aid to the progress of society and of science, by dispelling those delusions which impeded their growth, and rendered it impossible. It might have ministered, as undoubtedly it has, to the advancement of both, by rendering all our notions more clear, distinct, and precise than they had previously been, or would otherwise have been; and surely this service would have been of no slight magnitude. Thus the absence of real discoveries, if such were the fact, would not be an argument against either the utility or the validity of metaphysical speculation.

But we are disposed, also, to deny its asserted failure to produce real discoveries. It proceeds through a succession of analogous changes, which are renewed again and again with each completion

of the circle; and hence its history, to the eyes of the prejudiced or the uninitiated, appears to be merely a silly recurrence of identically the same doctrines. But it is not so: the progress, as the fertility of Metaphysics, consists in the more clear apprehension and explanation of the same subjects—in the gradually expanding comprehension of each recurring system—and, however close may be the analogy between the philosophies of Kant and Aristotle, of Hegel and Plato, of Schelling and the Neo-Platonists, of Comte and Hippo, none will allege that the modern systems are not in advance of the ancient, because the points of view respectively may be identically the same. This progress implies discoveries; perhaps not such as M. Comte contemplates: but what does he mean by real discoveries? It has not invented a new motive power, nor analyzed soils, nor discovered another planet; but such discoveries belong not to its sphere. But it has discovered the conceptions, and invented and defined their appropriate terms, by which our science, our philosophy, and all our higher speculations are carried on. If we were required to specify an instance of real discovery, we would say, it has proved that inability to comprehend causation which is the corner-stone of the vast edifice which M. Comte has erected. He did not deduce this doctrine from his own premises or for himself; he did not receive it from Bacon or any of the earlier lights of the Positive school; but he borrowed it from Hume. Can he say that this is not a real discovery? If he does, then he denies absolutely the sole foundation on which his whole colossal scheme is reared.

It is but too true that metaphysical speculation has been frequently little more than a patch-work of half-comprehended metaphors, which have been employed with fluctuating significations. But this objection does not affect its substance; it only touches its vesture. It were to be desired that a defect so grievous should be remedied, and it may be remedied to a very great extent. The nature of the human mind, and the manner in which its knowledge is acquired, necessitate the employment of direct metaphors, borrowed from the sensible world, in Metaphysics, more than in any other department of human study. We cannot reason about things ideal with ideal symbols: when we speak of these abstruse subjects, we are obliged to apply to their discussion the terms of the common vocabulary with which all are familiar. But the metaphors which we employ gradually become fixed and definite, and lose their metaphorical character, in the same manner that most of the words of our ordinary language have been formed by the conversion of metaphorical into direct expressions. Much care may, indeed, be needed to prevent the illusions which spring from their origin; still more to avoid the

illusions which arise from their vagueness and corruption in vulgar use. The charge is a valid censure on those metaphysicians who employ metaphors loosely, and do not adhere to any strict well-defined signification; but it cannot be conceived to constitute a valid objection against the whole existing body of metaphysical doctrine—still less against the possibility or value of any such doctrine.

But the unkindest cut of all is to complain of the effort which Metaphysics has made to become positive—according to M. Comte, the only mode in which science passes from an imperfect into a comparatively perfect state. We do not ourselves believe in the possibility or expediency of Metaphysics assuming a strict scientific form, but we think that it partially admits of a positive complexion; and that the more it can clothe itself with this type, the better, provided it does not exclude or fail to recognise the existence of what is incapable of this conversion. We think, too, that the manner in which the Scotch school has sought to attain a positive character has been lamentably indiscreet, and has, in some measure, conceded the argument to M. Comte; but what shall we say of his own proposal to construct a Psychology on the positive basis, after rejecting Metaphysics altogether, and cavilling at its attempt to assume a positive form at all?

Having answered these objections, let us be indulged in a few brief remarks on the validity, the use, and the importance of Metaphysics. After what we said in our previous essay, we shall not be suspected of a disposition to exaggerate these. Metaphysics must be valid, because it is spontaneous, inevitable, indestructible, and subserves purposes not otherwise to be effected. At the very foundation of all reasoning, and especially of all science, lie primitive and abstract ideas, such as matter, substance, being, property, cause, effect, change, nature, time, space, relation, number, quantity, quality, accident, &c., which must be defined and explained—or it must be shown how far they are explicable, and how far inexplicable—before science is possible. If these explanations be seriously incorrect, science will ultimately suffer its share of the penalty; and before the science can be reformed, the Metaphysics must be amended. The Metaphysical speculations of Leibnitz, dependent upon those of Descartes and Spinoza, led to the theory of the *vis viva*, which long troubled Mechanics, and has not yet received its final solution. Even Mathematics is nothing more than the development of special metaphysical ideas by a congenial metaphysical process; and the present confusion and prospective barrenness (we retort upon M. Comte with his own word with peculiar pleasure) must seek its remedy

from a renewed and more accurate analysis of the Metaphysical principles on which the higher parts of the Calculus rest. All our reasoning and science depend upon first principles, which lie within the domain of Metaphysics. We may except to the name, and propose another, but still there is the domain, whether it belongs to an acknowledged lord and master, or not: we may hew it in pieces and apportion the fragments among the various sciences, but the mutilated members can be gathered up, and they will grow together like the limbs of the rejuvenated Æson when removed from the caldron. The partition, as the change of name, is a kind of jugglery which can deceive no one but those who are too weak to avoid deception, or determined to be deceived. If there must be then a body of knowledge concerned with first principles, to explain the very foundations of science and all other reasoning, we cannot refuse to acknowledge the validity, the utility, and the importance of Metaphysics.

But to remove misapprehension, and prevent the confusion which may so naturally flow from the tenor of M. Comte's remarks—three parts true, and one part false as they are,—we promised also to show why Metaphysical speculation was critical, and how far it was so. Its critical character proceeds, in great measure, from the nature of the subject-matter, as we have already mentioned. As its data are immutable and incapable of multiplication, all that can be done in the development of metaphysical doctrine is to examine them: and as they form the latent premises of all knowledge, we cannot hope in our examination to advance a single step beyond them, or to discover facts or laws of greater generality than those which meet us at the outset. Hence progress in this kind of speculation must consist in the criticism of those facts, and of the previous explications which have been given to them; for they are not tangible, they scarcely admit of intentional modification or experiment, and their different aspects consist almost entirely of the different interpretations which have been put upon them. But it is only with respect to such first principles that Metaphysics is essentially critical; its further deductions are spontaneous and original, although it may be necessary, in confirmation of their validity, to show how they explain or refute other conflicting theories which profess to be founded upon the same facts.

Again: Metaphysics is characteristic of a crisis, because, during a transition from one intellectual system to another, before the goal towards which the movement tends has been discovered, the only hope of advancement must be sought in the analysis of existing or anterior systems, in order to detect the germs of truth which com-

municated to them their past vitality, and the sources of error which have resulted in their present state of paralysis. In a season of doubt and difficulty we are irresistibly thrown back upon a renewed examination of the first principles of our knowledge; and this, as has already been said, is the peculiar province of Metaphysics. That, at such a time, it claims more than its due share of human thought and regard may be very true. It follows from the tendency of the human mind to render every principle which it adopts, and every theory which it receives, sovereign and exclusive. But this tendency is just as strongly manifested in M. Comte's Positive Philosophy, and the present claim of Science to universal empire, as in Metaphysics, and is further illustrated by the past or present conflicts of all the various branches of human knowledge. If Hegel and Schelling in our own day assign to Metaphysics an all-embracing empire, a like claim has been advanced in favour of Mathematics by M. Hoënë Wronski, and in favour of science by M. Comte, and less systematically by the great mass of men of science. In reply to M. Comte's objections, let it be stated that the period of the greatest influence and activity of Metaphysics is not at any central epoch between two systems, as he seems to suppose, but just on the eve of a new advancement of *positive* discovery, and is so because its conquests are essential to the further progress of Science. Assuredly recent years, which have witnessed such a brilliant career of science, have been more illustrated by the prominence of metaphysical speculation than the centuries which preceded them. Hence, though Metaphysical science appertains to a crisis or period of transition, so far as we have admitted, and for the reasons which we have assigned, it does not exclude, though it does and it ought to colour, the coincident evolution of both theology and science, for even under the alleged domination of the Metaphysical spirit, and despite its attempts to secure a usurped jurisdiction, science has so rapidly advanced as in these latter days to press claims still more exclusive than those of Metaphysics have ever been.

We have thus endeavoured to exhibit both the truth and error of M. Comte's views in regard to Metaphysics: it is not the first time that Metaphysics has been rejected, nor is it the first time that the futility of such rejection has been shown. About three centuries ago, Marius Nizolius, of Brescia, in like manner affirmed Metaphysics to be partly false, and partly superfluous and unnecessary, and was answered long afterwards by Leibnitz.*

* "Metaphysicam partim falsam, partim supervacaneam, et non necessariam esse, affirmamus." Mar. Nizol. *De ver. princip. philosophandi*, lib. iii, cap. iv, p. 217, ap. Leibnitii opera. Ed. Dutens, tom. i, ps. i, p. 72. Vide etiam pp. 60, 61.

But, like his predecessor, Nizolius,* M. Comte entertains hardly any greater consideration for Logic than for Metaphysics. He does not, indeed, deny the existence of logical processes and logical procedure, and he speaks continually of logical laws, and boasts of the logical consistency of his work;† but he conceives that the principles of Logic cannot be manifested otherwise than in a concrete state, and can be exhibited only in connexion with the reasoning of the separate sciences. He considers that Logic as a science is denied in the negation of Metaphysics; and that Logic as an art of reasoning, and a doctrine to be separately taught, is eminently futile and ridiculous. He contemplates, however, the possibility at some future time of constructing a Positive Logic, or, in other words, a Logic of Inductive Philosophy, but thinks that the time for such systematization has not yet arrived; and we are strongly inclined to agree with him in this opinion, notwithstanding the profound and elaborate attempt of Mr. Mill. But he conceives that, even if such a body of Logical rules and principles could be constructed, it would be of very little avail, and entirely useless except in its combination with specific scientific inquiries.‡

On this criticism we have several observations to make.

M. Comte, of course, does not pretend to deny that correct reasoning differs from incorrect; he is, therefore, obliged to recognise the existence of Logic in its loose sense of accurate argumentation. He further admits that there are principles and that there must be rules, by which such accuracy is to be determined, but he deems any attempt as yet to discover them from the analysis of scientific procedure, premature. From this source, however, he thinks that the only valid or Positive Logic can be derived. No one has done more than M. Comte towards the enlargement of the field of Logic; no one has with equal skill and judgment analyzed the organization of the sciences, and indicated more clearly the nature and the manner of their conclusions. We willingly accept from him his important discoveries in this respect, and cordially welcome them as valuable accessions to the domain of Logic. Indeed, we regard his inductive philosophy, as systematized by Mr. Mill, to be the only considerable

* "Nunc ad Nizolii errores redeundum est, ex quibus, post Aristotelem interpretibus confusum, palmarius est, omnimoda illa Dialecticæ et Metaphysicæ abolitio, quam tamen et Nominales, iisdem principiis nixi, retinuerint. Et vero quis neget, esse quædam præcepta tum artis cogitandi seu scientiæ de mente, tum pietatis naturalis, seu scientiæ de summa rerum," &c. Leibnitz, *Præf. ad Mar. Nizol.*, § xxix, *Opera tom. iv*, ps. i, p. 60.

† "Toujours guidés par les principes logiques posés au tome quatrième," &c. *Cours de Phil. Pos.*, leçon lvii, tome vi, p. 491.

‡ *Cours de Phil. Pos.*, leçon i, tome i, pp. 38–40; leçon lviii, pp. 761–763.

enlargement of Logic, which has been effected since the writings of Aristotle. But we cannot pay the price which he asks for this augmentation; we cannot consent to regard it as subversive or exclusive of what we may call, for want of a better term, syllogistic Logic. Without this, indeed, the new addition would have been impossible as it would be valueless. Every branch of knowledge, when finally organized as a science, is so constituted by the process of deduction, and this M. Comte recognises. The facts are discovered and stripped of their deceptive appearance by observation and experiment; the general laws which regulate or co-ordinate those facts are gathered by induction; but the development of those laws into a science, their employment for the discovery or explanation of new facts, are the work of deductive or syllogistic reasoning, tested of course in each case by observation and experiment. We may go one step further and say, that induction itself presupposes deduction and employs the syllogism.* M. Comte perceives and acknowledges the necessary assumption of the proposition, that the operation of the laws of nature is general, in all inductive reasoning. This is the latent but indispensable major premiss in every inductive enthymeme. But here Comte would object, that, though this be true, yet we reason without having learned Logic, and adopt this premiss, as we pursue accurate reasoning, without reference to any technical rules of the syllogism. These objections are the old ones, which have been so often refuted before that we will not answer them again. They proceed upon the common delusion that Logic is the art of thinking and one mode of reasoning. It is not one mode, but the only possible mode of reasoning, notwithstanding Dugald Stewart asserts that "there are various modes of reasoning to which the syllogistic theory does not apply!"† It is not the art of thinking, but the art of avoiding and detecting incorrect reasoning, and recognising the correspondence of argument with the formal conditions of accurate demonstration. It is solely concerned with the form of the argument, not with its substance or subject matter. It does not pretend to furnish a man with the facts about which he reasons, but it guards him against fallacious deductions from those facts. M. Comte's objections to Logic are founded, like those of Dugald Stewart and its other antagonists, upon an entire misconception of the nature and functions of Logic. A due respect to

* We are aware that this is directly in contravention of the thesis of Mr. Mill, which has been so highly commended, (*Logic*, book ii, chap. iii,) which is notwithstanding invalid and illogical.

† *Philosophy of the Human Mind*, pt. ii, c. iv, p. 112; vide p. 111, and pt. ii, chap. iii, sect. i.

this science might have saved him from that confusion of its equivocal meanings, and that utter ignorance of its true scope and character, which have led him to reject it. It is strange, indeed, that so much should have been written in disparagement of Logic, and yet not one of the distinguished authors who have impugned it has had the least acquaintance with its true objects and nature. From John Locke to Augustus Comte not one of its adversaries has clearly understood what the Logic was which they condemned. As the science which explains the natural laws and procedure of the human mind in reasoning, it is essentially indestructible; as the art which applies to daily use the rules gathered from those laws, it is of the highest importance, although it does not teach us to reason, nor apprise us of the conclusions of science, but acts within a much more limited range. We ourselves care little for the censure of those meagre systems of Logic which have long been regarded as constituting the science; but when an attack is made upon the validity of deductive Logic, in general terms, we must express our positive dissent.

This tendency to reject Logic has sprung from the negligent study of Bacon, and a misapprehension of the tenor and design of his remarks. He objected to the *a priori* construction of science by deduction from assumed premises, and indicated the necessity of collecting these premises by induction from observation and experiment. But he clearly, distinctly, and continually avowed the value and importance of deductive Logic, in its proper sphere, and in the development of the various branches of Ethical science.* The blunder of denying the value of Logic, and of supposing that Bacon denied it, must be charged exclusively upon the ignorance of his followers of the precepts given by their master. When Logic boasts of such advocates as Aristotle, Bacon, Leibnitz, Kant, Hegel, and Mill—the chiefs of the most various philosophies—it may smile at the opposition of Dugald Stewart and the Scotch school, and may disregard the rebellion of M. Comte. Its validity and its use have been proclaimed by the greatest minds of all ages, and the strong eulogies of the Scholastics have been paralleled by the more sedate praise of Bacon;† the vivid mind of Leibnitz insisted strenuously

* De Augm. Sci., lib. ii, vol. viii, p. 83; lib. v, c. i, p. 256; c. ii, p. 262. Fab. Cup., vol. xi, p. 99. Adv. Learning, vol. i, p. 193.

† There has been so much misapprehension of Bacon's views of Logic that we take the liberty of quoting one passage:—“Pars ista Humanæ Philosophiæ, quæ ad Logicam spectat, ingeniorum plurimorum gustui ac palato minus grata est; et nihil aliud videtur quam spinosæ subtilitatis laqueus ac tendieula. ° ° At istud lumen siccum plurimorum mollia et madida ingenia offendit et torret.

upon its indispensable necessity;* and the critical depth of Kant is enraptured with "the certainty, the beauty, and even the utility of Logic."† If all positive knowledge is scientific, it is attained by reasoning; if attained by reasoning, its accuracy or inaccuracy must be determined by Logic, which only professes to determine the formal conditions of correct or fallacious argument. Had M. Comte not rejected Logical science he would have avoided the fundamental error of his philosophy of assuming a part for the whole, and of concluding that what might be true of a part was also true of the whole. He might have gone further, and, as he has traced the anarchy and revolutionary character of our times to its intellectual aberrations, he might have traced back these aberrations to the illogical character (which he recognises) and the disregard of Logic, which have prevailed for the last three centuries. So far as his objections to Logic are just, they are inapplicable to either the art or the science properly understood: so far as they are applicable, they are unreasonable.

Having thus taken notice of those important branches of human knowledge which M. Comte rejects, we are prepared to enter into the further consideration of the Positive Method, as illustrated by that Hierarchy of the Sciences, constructed or to be constructed, which he recognises. But we deem it proper to stop here for one moment to state the reasons which have induced us to dwell so long upon inquiries that may seem almost excluded by the nature of M. Comte's system, and may consequently appear to be merely preliminary to its discussion. In reality, however, these are the most important points presented in the discussion of the Positive Philosophy. The key-note to any system of philosophy must be sought in its fundamental principles and method: the criticism of these is the most satisfactory, as well as the briefest criticism of the whole; for the entire edifice is determined as soon as the data and method are established. But in the philosophy of M. Comte the exclusion of Theology and Metaphysics is one of the fundamental axioms, because it is rather assumed as a basis for Positivism than legitimately

Ceterum unamquamque rem propria si placet dignitate metiri, *Rationales Scientiarum reliquarum omnino claves sunt.* Atque quemadmodum manus instrumentum instrumentorum, anima forma formarum, ita et *illæ artes artium ponenda sunt.*" De Augm. Sci., lib. v, c. i, vol. viii, pp. 255, 256. By Alcuin, Rabanus Maurus, and Abelard Logic was called "Disciplina disciplinarum," "dux universæ scientiæ," "sola dicendi scientia;" and of it they said, "hæc docet docere, hæc docet discere," and "scit scire sola."

* De Conform. Fid. cum Rat., §§ 62, 65; Opera, pp. 102, 105, §§ 27-31; tome i, pp. 84-87. Leibnitz Œuvres, ed. Jacques, vol. ii, pp. 93, 96, 75-77.

† Kant Logique, trad. Tissot, pp. v, vi.

deduced from it; and this exclusion decides, in great measure, the character of the method. It is this, which we regard as the vital error of the whole creed, and consequently on this point the validity or the invalidity of the scheme mainly turns. We have recognised and are willing to repeat our conviction of the justice and solidity of the Positive system as strictly applied and confined to science; but we maintain also the absolute necessity of recognising a knowledge which lies beyond the circle of scientific systems, of retaining those very branches of learning which M. Comte rejects, and we deem this to be as much required by the interests of science as by the claims of a correct and all-embracing philosophy. There is a peculiar difficulty in refuting a long and elaborate work, whose details are for the most part as correct as they are profound, and spring legitimately from a philosophy in which truth and error are closely intermingled, with a very decided predominance of the former. It is easy enough to reply to positions and systems entirely erroneous; but when more than half is true, it is an arduous task to detect those fallacies from which the dangerous tendencies flow, without denying that which is just and solid. We have attempted to do this, rendering free credit and assent to what is valid in M. Comte's system, and at the same time refusing and refuting his errors, and tracing their origin and dependence. Their source we have detected in his illogical divisions and illogical exclusions, and as this part of our labours is virtually a refutation of the fundamental sophistry involved in the *Cours de Philosophie Positive*, we have been obliged to dwell upon these topics at greater length than a superficial observer might have deemed either requisite or appropriate. This apparent delay, however, enables us to achieve the remainder of our task within comparatively brief limits, though we shall be detained somewhat by a discussion of M. Comte's estimate of Mathematical Science, in consequence of its connexion with the Logic and Metaphysics which he has rejected.

As the simplest or least complex facts are those which are first observed and explained, so in the development of the Positive Method and its application to the classification of the sciences, these must succeed each other in proportion to the increasing complexity of their subject-matter. As each science requires for its full comprehension the aid of all the previous sciences, that which involves the simplest ideas and stands at the commencement of the scale, must constitute the proper introduction to all the others. Such is the position of Mathematics, and such is one of its functions. We might except to these principles, inasmuch as the sciences react upon each other and mutually require the aid of all the others; but

as this scheme of classification is the most clear and comprehensive that we have seen or can conceive, and probably as perfect as the nature of the case will permit, we receive it without question, and concede to M. Comte the praise of having solved a difficulty which Bacon could not master, and which D'Alembert could not diminish.*

The progress of the sciences, as history attests and as their present condition confirms, has been in the main, perhaps not entirely, in accordance with the principles just laid down, and therefore in proportion to their simplicity. Hence Mathematics "constitutes the first and the most perfect of all the fundamental sciences."† In regard to its exquisite perfection there can be no doubt, though we may find it necessary to examine into its extent and its explanation; but it can only be regarded as the first and fundamental science, by cashiering Metaphysics altogether, denying the possibility of any metaphysical doctrine, and striking it completely out of the field of view. This, as we have already stated, M. Comte does: he says that beyond Mathematics we cannot go without falling into the dream-land of Metaphysics.‡ This is, indeed, the only step beyond; but, as we have also said before, his reluctance to take this step—his arbitrary and arrogant negation of any such conceivable science—his effort to establish all human knowledge on a new basis, and to reform all modes of science, without recourse to metaphysical inquiry—constitute the really weak and defective side of his system, neutralize much that is good in it, and render it essentially imperfect, and insufficient for the ultimate purposes designed. It was intended to render this scheme of philosophy the spear of Ithuriel to test the validity of all knowledge, but the head of the spear, with all its magic virtue, is wanting, and the pointless shaft will not be found to be the wand of the true enchanter. All science must rest ultimately on the data and conclusions of the philosophy of the human mind: without these the support for the superstructure is wanting; and it is this basis—the *ποντικόν στῶ* of all human knowledge—which Comte has deliberately refused to employ.

It is singular enough that this sneer at Metaphysics, which contaminates his whole reasoning, should be presented in connexion with Mathematics, and alleged as a reason for regarding the latter science as primary and fundamental. But Mathematics is purely a concrete form of Metaphysics—being eminently metaphysical in

* Dug. Stewart's Diss. on the Progress of Metaphys. and Phil. Supplement to Encyclop. Britan., vol. i.

† Cours de Phil. Pos., leçon iii, tome i, p. 145.

‡ "On ne saurait tenter d'aller plus loin sans tomber inévitablement dans les rêveries métaphysiques." Cours de Phil. Pos., leçon iii, tome i, p. 145.

its conceptions, its materials, and its development. The *substratum*, which Comte deems it impossible to discover, is the connexion of the laws and processes of human reasoning with the materials to which it is applied. Take away the *subjecta materia*, quantity and relation, and the residuum will be the abstract laws and processes of the human mind, exhibited as applicable to all reasoning, and which, as abstractions, we may regard as existent even when not operative, i. e. Metaphysics. The substance of Mathematics is composed of two metaphysical conceptions; its axioms are purely and strictly metaphysical propositions; and its procedure is merely the deduction by Logic from these axioms and from the definition of those conceptions of the truths involved in them.

The fact, which would otherwise be inexplicable, that the great Mathematicians have also been the great Metaphysicians of their respective ages, might have led M. Comte to suspect some intimate connexion between the two departments of knowledge, if he had not been blinded by his prejudices.*

But Metaphysics being absolutely rejected, and Logic unceremoniously shoved aside, some primordial science must be introduced in their place to constitute the canon and the touch-stone of reasoning. This, under the new *régime*, is to be one of the functions of Mathematics. The rigorous logical universality of mathematical science † is announced to us as a new revelation to console us for the extinction of the old: we are assured that there is no question whatever which may not be conceived as ultimately reducible to a question of numbers,‡ and consequently brought within the range of mathematical solution. But is this possible in the case of social phenomena,—History, Law, Morals, Political Economy, &c.,—to say nothing of the rejected claims of Metaphysics and Religion? There is a large verge in these for the application of mathematical procedure, as the brilliant researches of M. Quetelet have proved; but these sciences cannot be entirely absorbed by Statistics. M. Comte has himself mentioned Pathology as an exception to his maxim. Certainly, in the present state of that science, Mathematics is not applicable to it, though we may readily conceive it to be so improved as to permit a partial employment of mathematical processes. But, in the other sciences which we have mentioned, the diversity and the varying intensity of the operative influences, the constant flux of modifications which they are ever undergoing, must at all

* Pythagoras, Plato, Descartes, Galileo, Barrow, Newton, Leibnitz, and we might add Kant.

† Cours de Phil. Pos., leçon iii, p. 162.

‡ Cours de Phil. Pos., leçon iii, pp. 148, 149. Cf. p. 162.

times continue to withdraw them from the range of an exclusive mathematical treatment.* Hence the complaints of writers on the sociological sciences against the introduction of such modes of reasoning or illustration. It will not suffice to say that Mathematics is applicable, but the phenomena are too complex to admit of mathematical treatment. From whatever cause the impossibility to apply it to such questions may arise, that impossibility is proof of inapplicability. M. Comte admits † that the difficulty of its application to any but the most simple phenomena is insurmountable; and this, though not actually inconsistent with his previous assertion of its logical universality, is repugnant to it. If it may be conceived applicable in theory, but is found inapplicable in practice, this discrepancy might be reconciled upon a metaphysical basis; but after the abnegation of all Metaphysics, it would be an inadmissible explanation, and M. Comte can seek no aid from that source.

We were surprised to find that Sir David Brewster had fallen into the same delusion: "No sound knowledge," says he, "can exist, but that which rests immediately on facts, or is deduced from them by mathematical reasoning."‡ Sir David believes in Christianity and Metaphysics—in the former at least,—and we have a shorter reply for him. If this position be true, where is the evidence of inspiration or revelation, and whence the truth of religion? Yet he afterwards most justly repreunds the atheism of Comte. Is the being of God to be proved or confirmed by a simple algebraic equation? or the truth of Christianity by a differential formula?

Our animadversion upon the exclusive and unlimited claims of mathematical procedure by no means prevents our appreciation of the value of the science as a means of intellectual discipline and an efficient instrument in all scientific researches. We cordially assent to the eulogies bestowed upon it by M. Comte, bating their exclusiveness; and while we make this exception, we would remind him that almost every one of his Lectures is filled with reclamations against the tyranny and unrestrained ascendency of the mathematical spirit, whence, according to him, has proceeded that specialization of modern scientific inquiry, of which he constantly complains,§ and that prolongation of intellectual anarchy, which he

* τὴν δὲ ἀκριβολογίαν τὴν μαθηματικὴν οὐκ ἐν ἀπασιν ἀπαιτητέον. Aristot. Metaph. A. minus, c. iii, p. 995, b. 14. Aristotle had discernment enough to perceive that even mathematical accuracy could not be expected in all reasoning, much less mathematical procedure.

† Cours de Phil. Pos., leçon iii, tome i, p. 151.

‡ Review of Comte's Cours de Phil. Pos., vols. i, ii. Edinburgh Review, July, 1838, No. cxxxvi, art. i, p. 1.

§ Tome vi, pp. 67, 125, 289, 290, 302, 310, 312, 328, 339, 345, 452, 456, 457, 813.

is desirous of bringing to an end. In fact, we agree cordially and fully throughout with M. Comte's positions, except so far as they are warped from the truth by the excessive latitude and exclusive character of his principles; and slight as the amount of error may appear, in comparison with the whole body of the Positive doctrine, every fallacy and every pernicious tendency, with the exception of a few fantastic extravagances, may be legitimately traced to these fundamental defects.

But M. Comte is neither the first, nor the only philosopher, who has assigned to Mathematics its pre-eminent importance as a discipline for the mind, and who has required it as propædeutic to other scientific studies. Every one is familiar with the celebrated prohibition of Plato, but is not equally familiar with the ground on which it was placed by him. He regarded Mathematics not as a part of philosophy, but as introductory or progymnastic to it;* and the Peripatetics assigned to it a function closely analogous to that which is attributed to it by M. Comte.† The weight of Lord Bacon's opinion, as also of John Locke's, is thrown in the same direction; and in very recent times a learned, but most eccentric writer, who aims at the same practical ends as Comte, but whose philosophy starts from the opposite pole, and contemplates not the extinguishment, but the resuscitation of Christianity, asserts the same dogma,‡ though he too protests against the present ascendancy of Mathematicians.§

In conceding the claims of Mathematics in this respect, we might possibly be supposed to concede more than could be justly or safely granted. It may be well, then, to inquire, Whence does its peculiar efficacy spring, or, which is nearly the same question, What is the cause of its scientific and logical perfection. This problem has in all ages afforded so large a scope for misapprehension and crude

* φασὶν ὅτι τὸ μαθηματικὸν οὐκ ἔστι μέρος τῆς φιλοσοφίας, ὡς καὶ ὁ Πλάτων δοξάει· καὶ γὰρ οὐτος τὸ μαθηματικὸν οὐ δοξάει μέρος τῆς φιλοσοφίας, ἀλλὰ προγνυμνασμά τι, ὥσπερ ἡ γραμματικὴ καὶ ἡ ἀριθμητικὴ· δύνειν καὶ τῷ ἀκροατηρίῳ ἐπέγραψεν “ἀγεωμέτρητος οὐδὲν εἰσίτω.” David, Schol. Aristot., p. 12, b. 8; vide Comte i, p. 112.

† τὸ μαθηματικὸν μέσον ἔστι τοῦ φυσιολογικοῦ καὶ θεολογικοῦ, ὡς καὶ τῶν δύο μετέχον· καὶ γὰρ ἐννέαν ἔστιν ὄμοις τῷ φυσιολογικῷ, καὶ ἄλλον ὄμοις τῷ θεολογικῷ. David, Schol. Aristot., p. 15, b. 3, v. 24. This is Comte's distinction between pure or abstract and concrete or mixed mathematics. Leçon iii, tome i, pp. 138, 139.

‡ Hoëné Wronski, Messianisme, tome ii, p. 600. We might have added Roger Bacon to the above list. “Et harum scientiarum (the four great sciences) porta et clavis est mathematica.” Opus Majus, ps. iv, c. i, p. 43, editio Veneta. But it is easy to multiply such authorities.

§ Hoëné Wronski, Messianisme, tome i, p. 18.

reasoning; it has been so miserably misconceived by idealists of every shade and school, from Plato to Dugald Stewart, that the present discussion may have other advantages than those which spring from the reduction of M. Comte's views within correct limits.

The doctrine, that mathematical truth or reasoning indicates the existence of absolute, eternal, infinite, and immutable truth, was familiar to Plato and his followers, as is proved by the examination to which it is subjected in the *Metaphysics* of Aristotle, and in the commentaries of his scholiasts. It was revived by Descartes and Spinoza, received by Leibnitz, reasserted by Kant in the least logical part of his great work, adopted by Whewell without being comprehended, clamoured over by the whole Scotch school, and it again reappears in Victor Cousin and Morell. Yet even Aristotle and the Peripatetics perceived that Geometry and the other branches of Mathematics were founded upon observation.* The argument of Morell is mere "*crambe repetita*;" but as a repetition in a concise form of the old staple argument, we may use it as the target for our batteries. "Take for instance," says he, "any axiomatic truth of pure mathematics. It is not through mere sensation that you have arrived at it; neither is it an arbitrary relation of your own production; nor is it conceived of in pursuance of any resolution of your own will. Try as you may, and you cannot alter the conceptions of pure reason even to an infinitesimal degree," &c. Whence he concludes that mathematical truth is transcendental and ideal.† All this is true except the inference deduced from it. There is no necessary or logical relation between the premises and the conclusion. The premises are true, because in subjects not immersed in matter, but confined entirely to the region of the intellect or pure reason, the assumptions being taken and developed according to the fundamental and immodifiable laws and processes of the human mind, the mind would have to go out of itself, and contradict its own nature, to arrive at the possibility of considering conclusions in such subjects otherwise than as they appear. In like manner, and for the same cause, such facts or truths present themselves without difference or variation, because they lie beyond the circle of passion and imagination, and result only from those general laws which are the common and necessary conditions of all intellectual action. Hence an ample explanation of mathematical truth may be afforded without any appeal to an invisible and imaginary universe; and consequently if there be such other explication of the facts, the logic of

* Aristot. *Metaph.* x, ii, p. 1060, b. 13; xii, iii, pp. 1077, 1078; xiii, ii, p. 1090, a. 13; iii, p. 1090, b. 7; and Alexander Aphrodisiensis, Schol. Aristot. p. 524.

† Crit. Hist. Phil., xix. Century, pp. 54, 55.

Morell's reasoning is invalidated, and the premises are insufficient to sustain the conclusion. Morell perceived that the reasoning of Descartes on this subject was in a circle,*—how could he then fail to perceive the fallacy of his own?

Into the error of the Idealists M. Comte was of course secure against falling. He very properly traces the strict logical accuracy of mathematical reasoning to the fact that Mathematics is only the explanation of the relations of mutual dependence existing between all parts of the abstractions which constitute its subject.† This, however, is only a secondary proposition, consequent upon the more general truth which forms the basis of mathematical science, to wit, that it takes cognizance only of abstractions, which are purely creations of the intellect,‡ stimulated indeed by observation, but independent any further of external matter, and therefore not liable to be disturbed or infected by the qualifying circumstances, and changing modifications, and complex aspects of everything external. These abstractions, once conceived and assumed, are developed in accordance with the pure and undiluted processes of the mind, and therefore the science which is founded upon them, consists merely of the explanation of the new relations discovered or occasioned by the intellectual modifications under which they are conceived to exist. Hence Comte's explanation is not the primary, but the derivative cause of the stringent universality and absolute perfection of mathematical truth. It fails from being in defect, as the theory of the Idealists failed from being in excess.

The rejection of Metaphysics is the stumbling-block in M. Comte's way, which prevents him from arriving, like Aristotle, at a complete solution of the question. It has also led him into an inconsistency; for, notwithstanding this rejection, he does finally rest the perfection of mathematical science upon what can hardly be regarded in any other light than as a metaphysical ground. He says that its perfection is occasioned by the extreme simplicity of the ideas which it contemplates.§ Aristotle says the same thing, but with a spirit of so much larger comprehension as to change the character of the doctrine.|| He recognises and acknowledges the dependence of Mathematics on Metaphysics.¶ We would ask M. Comte what is

* Crit. Hist. Phil., &c., pp. 119, 120.

† Comte, Cours de Phil. Pos., leçon iii, tome i, p. 130.

‡ This Aristotle clearly perceives. He says that mathematical reasoning is ἐξ ὑποθέσεως. Metaph. iii, ii, p. 1005.

§ Cours de Phil. Pos., leçon iii, tome i, p. 148.

|| Aristot. Metaph. x, iii, p. 1061, a. 28-b. 8 ; vi, x, p. 1036, a. 9.

¶ ἐπεὶ δὲ καὶ ὁ μαθηματικὸς χρῆται τοῖς κοινοῖς ἰδίωσ, καὶ τὰς τούτων ἀρχὰς ἀν εἰη θεωρῆται τῆς πρώτης φιλοσοφίας. Metaph. x, iv, p. 1061, b. 17.

the nature of those simple ideas with which Mathematics is concerned? and what is the cause of their simplicity? It is that those ideas are purely metaphysical, and are therefore exempt from the fallacies and limitations which would be necessarily attendant upon any discussion beyond the magic circle of purely metaphysical speculation. The ideas contemplated by Mathematics are purely metaphysical as being intellectual abstractions; and the simplicity of the science is due to the strict retention of all its processes within the narrow and definite limits of logical intellection—which is metaphysical also. We are constantly informed by Aristotle and his commentators that the subject of Metaphysics is, $\tau\delta\ \delta\nu\ \eta\ \delta\nu$, and with this the definitions assigned by all great metaphysicians accord.* If this definition is intelligible, is it not obvious that the province of Mathematics, in its higher and more abstract character, falls within its domain? if it is otherwise unintelligible, does not the nature of Mathematics light us to its significance?

Again, M. Comte rightly distinguishes between applied Mathematics (*Mathématique concrète*) and pure Mathematics (*Mathématique abstraite*), characterizing the former as “experimental, physical, phenomenal,” the latter as purely logical or *rationnel*.† Abstract or pure Mathematics are, as we have said, only the development of abstractions and assumptions which the mind has defined for itself. From whatever source these abstractions be taken, whether we regard them as the spontaneous products of innate intellectual tendencies, or conceive them to be generalizations and segregations from observed facts, after they are once received as data, no further subject-matter is introduced either by observation without, or genesis within; but we unroll the implicit and latent relations, which are involved in those data, and prosecute the development under the sole guidance of the reasoning tendencies of the human mind, or, in other words, in strict obedience to those vital laws of reason, which are inseparably connected with the thinking faculty of man. Hence, abstract mathematics is entirely the creature of reason, and therefore strictly logical; but the necessity of a constant reference to external facts, whether in the way of observation or experiment, infects applied mathematics with the deficiency incident to every part of knowledge derived *ab extra*, and thus renders it phenomenal, and of course experimental and physical.

From this discussion of the nature and validity of mathematical reasoning we may readily deduce the causes of its efficacy as an

* “*Metaphysica agit tum de ente, tum de entis affectibus.*” Leibnitz, *De Arte Combinat.* Proem. Op. tom. ii, p. 344.

† *Cours de Phil. Pos.*, leçon iii, tome i, pp. 138, 139.

intellectual discipline and propædeutic, and also of its almost universal applicability.

Abstract Mathematics, it follows from what we have just said, is only concrete logic—it is the strictest logical procedure united and applied to the simplest and most congenial subject-matter. As concrete knowledge always presents fewer difficulties than abstract; as the practice of accurate and logical reasoning must be more efficient in inducing a like habit than any theory or art of its procedure can be, Mathematics, which is the strictest, as well as the simplest form of concrete logic, must be eminently adapted to become a wholesome discipline of the reasoning faculties. It is, however, merely the drill of the soldier, not the science of the general. It generates a spontaneous accuracy in ordinary practice, but it throws no light on the validity of its own procedure, nor does it render that most essential service of pure logic—a canon for the detection of error and the exhibition of its causes. But from this explanation we can also perceive how the prevailing devotion to mathematical studies during the three centuries which have witnessed the disregard and decline of Logic has been efficacious in postponing even to our own day the fatal consequences which must flow from inattention to the principles on which all reasoning must rest, and the limitations within which alone it can be valid.

The hydra-headed error, with which we have been contending, springs up again when we proceed to consider the reasons assigned by M. Comte for the singular efficacy of Mathematics as an instrument in its application to other sciences. This he justly refers to the generality, the simplicity, and the purely abstract character of the conceptions with which it is concerned.* But there is a step beyond, which he was prevented from taking by the fast-anchored error from which his whole system takes its departure. Having commenced with the denial of all Metaphysical science, actual or conceivable, and having assumed as the scope of his labours the substitution of a scheme, which might dispense with and render nugatory all metaphysical inquiry, he was estopped from taking the necessary step in advance, as it would infallibly have led him within the confines of metaphysical speculation.

We are barred by no such self-imposed limitation, and take this step in confidence. Mathematical reasoning is the logic of definite or definable relations. Its forms are generalized and simple abstractions: as such, they are applicable to any subject where such relations can be detected; and, being applicable in all such cases, they convey their significance without any recognised subject-

* Cours de Phil. Pos., leçon iii, tome i, p. 146.

matter other than those relations, and are true, independent of the specialities to which in practice they may be applied. This explains the extent of the range, and the general applicability of mathematical procedure.

So far, the errors of M. Comte have been found all connected, and springing as ramifications from one central error—the supposition that all knowledge might be embraced within the circle of scientific reasoning. From this fallacy have sprung his rejection of Theology, Logic, and Metaphysics, his distribution of the periods of human history, and the progress of human intellect into three stages, his substitution of Mathematics for the sciences which have been condemned. Having refuted his delusions in this respect we have criticised, so far as they require criticism, nearly the whole peculiarities of the Positive Philosophy. Its separate applications would, indeed, well reward our attention had we time for their consideration, but they may be judged by the principles we have established in connexion with the special criticism derived from each separate science. It is only necessary for the completion of our view of the Positive Method to mention the principle of classification employed in the arrangement and distribution of the successive branches of science, and then we may pass on to a consideration of the tendencies of the Positive Philosophy and the dangers to be apprehended from it, with a brief statement of which we shall conclude our long essay, leaving for a future notice of the République Occidentale the consideration of M. Comte's development of his principles and conclusions into a scheme of social regeneration and social philosophy.

As Mathematics constitutes the primary and fundamental science in the Positive System, in consequence of the peculiar simplicity of the ideas which it contemplates, so the general principle which regulates the relations and successions of the other sciences is, that those which are the most abstract, or whose speculations are conversant with the most simple and homogeneous subjects, are first in rank, in order of development, in perfection, and furnish the bases for the more complex sciences. A similar view of classification seems to have been involved in the reasons assigned by the ancients for the precedence which they gave to Arithmetic and Music over Geometry and Astronomy.* The same principle is also employed to determine the subdivisions of the sciences, which are further distinguished into their statical and dynamical branches.† There can be no doubt that this principle of system-

* David, Prolegg. Phil. Schol. Aristot., p. 15, b. 34. Cf. p. 16, a. 38. Asclep. Schol. ad Metaph., p. 606, a.

† Cours de Phil. Pos., leçon i, tome i, p. 33.

atization is more philosophic than any that preceded it, and infinitely preferable to all others in the results to which it conduces. M. Comte's criticisms on former modes of classification are both just and acute, and it is not the least tribute which has been paid to his philosophic ingenuity that the elaborate but too cumbrous and artificial scheme of Ampère is virtually built upon his, and involves most of what is distinctive in it. Of course, even in this part of his labours, the exclusion of Theology and Metaphysics invalidates the plan; but it rather renders the scheme incomplete, than affects the value of his arrangement so far as it goes. He does, indeed, erroneously deny any distinction between Moral and Physical Science,*—a distinction which is perhaps exaggerated in the classification of Ampère,—but this was a necessary consequence of the false and contracted basis on which the whole edifice was reared. It is, however, easily corrected. But we must also remark that while it is perfectly true that the more complex sciences require and presuppose the assistance of the more simple sciences, these themselves for their improvement need the aid of the more composite and difficult. The reaction is not equal to the action, but its influence is very decided, and all parts of knowledge are mutually dependent on each other,—

alterius sic

Poscit opem res, et conjurat amice.

M. Comte recognises this interdependence, but the tendency of his system is to impede the recognition of its importance. One signal consequence of his system, which he does not fail to reiterate, is that all the sciences hang together, and explain each other:—that the attempt to treat them as entirely separate and distinct is to destroy their value and to insure their ruin, and not theirs only, but the infection of the whole tone and temper of human intellect. It is to this effort, whether consciously or unconsciously made, that he refers that excessive specialization of modern thought, which is so intimately connected with the anarchy of the age. The detection of this error is a service which is entitled to the most cordial appreciation.

The application of the principles which we have mentioned and discussed, results in the development in regular order, of the several sciences which have been created by human genius and industry. These are arranged in a tabular form and in their genetic order in a scale of classification prefixed to the first volume of the work. First appears Mathematics, with its subdivisions, the Calculus, (including Arithmetic with the various forms of the Integral and Dif-

* Cours de Phil. Pos., leçon lvi, tome vi, p. 24.

ferential Calculus,) Geometry, and pure Mechanics. Next comes Astronomy, divided into Astronomical Geometry and Astronomical Mechanics. Then follows Physics, which treats of Barology, Thermology, Acoustics, Optics, and Electrology. From these we proceed to Chemistry, Organic and Inorganic, and thus complete the circle of the sciences of inanimate matter. The next stage introduces us to the complex phenomena of the world of life, and here the deficiencies of M. Comte's fundamental principles begin to reveal themselves in fatal fallacies. The first science of organized bodies is Biology, or the theory of animation, a branch of knowledge whose outlines are as yet sketched only with a wavering and uncertain hand, although the sagacity and ingenuity of M. Comte are strikingly exhibited in the general tenor of his remarks. To this head he refers Anatomy, the Physiology of vegetation, animation, the intellect and the passions, and under it admits Phrenology into the circle of the Positive Sciences. Having thus completed the theory of human and animal nature, which he assimilates too closely to each other, he passes on to a science partly reconstructed, but in great measure created by himself, Sociology or Social Physics, and thus adds the crowning stone to his simple, systematic, and comprehensive plan: Parts of this last department of study had been previously elaborated, but either under too isolated a form, or on too arbitrary a basis, but M. Comte proposes to develop them in their mutual connexion and harmonious interdependence. Thus he objects to a separate science of Political Economy, on grounds which are not altogether valid, although they have been too little regarded by the followers of Adam Smith and Ricardo, and which, after having been ably examined by Mr. Mill, in his system of Logic, have been utterly disregarded by him in his treatise on Political Economy. We cannot dwell upon this portion of the Course of Positive Philosophy, because it does not legitimately fall within the restricted scope of this essay, but, admirable as is the whole work, no portions of it, in our estimation, exhibit so much depth, comprehension, originality, and acumen as the fourth and sixth volumes in which the application of the historical method to the philosophy of society is developed, and the outlines and conditions of the new science of Sociology are laid down.

Thus by a regular and strictly logical progression M. Comte leads us through the whole circle of *Positive* science, constructed or conceivable; and, throughout, his whole system is the consistent evolution of certain principles which he lays down at the outset. Stage above stage, in orderly sequence, the elaborate structure rises, proceeding from the more simple to the more complex in accordance with the necessary conditions of knowledge, until its ever-widening

horizon circumscribes the whole sphere of intellectual pursuits which can fall within the apprehension of the Positive philosopher. Some branches of knowledge are, indeed, excluded from this vast temple of human learning, in consequence of an error involved in the fundamental position of his philosophy, which infects, more or less, its whole development; but overlooking this error and its consequences, no more complete or perfect exposition of the genius, the functions, the successions, the defects, or the excellences of the various sciences can be imagined. The mighty edifice, and the fatal fallacy which is embodied in its construction, remind us, indeed, of the endeavour at Babel to raise by human effort a ladder to the skies; and of the legend of Greek mythology which tells how the giants of the elder world attempted to scale the heavens by piling Pelion upon Ossa, and Ossa upon Olympus, in the vain hope of hurling the gods from their thrones. The history of that futile enterprise is written,—

Affectasse ferunt regnum celeste Gigantias,
Altaque congestos struxisse ad sidera montes.
Tum pater omnipotens misso perfregit Olympus
Fulmine, et excusset subiecto Pelion Ossæ.

A like fate attends M. Comte's labours, so far as their ultimate aim is concerned; but the mountains which he has reared will remain, a perpetual memorial of his greatness, and will attest, notwithstanding his failure to achieve the object contemplated, that his work was the work of the Prince of the Titans.

Our long exposition of the character and defects of the Positive Method will enable us to exhibit briefly the character and efficiency of the Positive Philosophy. It will be readily perceived that it is a system of extreme sensationalism, or, more correctly, it proceeds beyond sensationalism in the same direction, by absolutely refusing to entertain any opinion, or tolerate any theory in explanation of the origin or validity of human knowledge. It recognises all the great properties of the human mind, except its religious and metaphysical appetencies, and receives all the primary conclusions of the intellect and perceptions of the senses, purely as phenomena, without taking any cognizance of the existence of either substance or cause behind the phenomena. As a partial explanation of human knowledge, as a theory of its systematized or scientific branches, we admit the value and absolute truth of this interpretation—but merely in connexion with an extra-scientific recognition of the unscientific sphere of human knowledge and belief. It ought to be, therefore, eminently efficacious within its own peculiar sphere in producing larger, wider, and healthier views of science, though we much fear its value even in this respect is seriously impaired by the prejudices

which it will excite, and the fallacious exclusiveness of view which it will occasion, by its rejection of all religious belief and doctrine. In fact, science can no more dispense with the recognition, open and avowed, of an unquestioning faith, than the human race can afford to discard Christianity. Science, to achieve its noblest triumphs, to render its most eminent services to humanity, must be irradiated with that celestial light, "which lighteth every man that cometh into the world." "*Cœli enarrant gloriam Dei,*" "the heavens declare the glory of God," and all science is but the dim and imperfect revelation of the goodness, the majesty, the power, and the wisdom of Jehovah. It is almost valueless except so far as it ministers to the greater happiness, morality, and permanent comfort of man and of society. Can these things be secured without religion? The unbecoming flippancy of the speech of M. Comte, that the heavens declare only the glory of Newton and Laplace, is strangely ill-turned, at a period when all the discoveries in Science and Philology tend to confirm the narratives of Scripture and the precepts of revelation. There is a maxim immortalized in our own English poetry which may be suitably commended to M. Comte, as the only rebuke of which a declaration, so unworthy of his lofty genius, is entitled to,—

An undevout astronomer is mad.

It belongs to the consideration of M. Comte's scheme for the renovation of society, as expounded in his latest work, to examine the special aptitude of the Positive Philosophy for this purpose. We can only say here, that the total negation of all religion allows no hope of its having any such efficacy, and is by no means in consonance with his acute discovery of the causes of present anarchy and present social evils in the unregulated license of the passions, and the decay of the noblest affections—confidence, justice, charity, mutual regard, and sympathetic faith.

The Positive Philosophy is then entirely invalid as a reformation of the intellect of the world, for it excludes the idea of such reformation in those very points in which it is most imperatively required. It is valid merely in reference to strict science, and for its full validity even in this respect it requires the cordial recognition and the lively appreciation at all times of nearly everything which M. Comte excludes. If received by itself as the gospel of a new era, it perpetuates and increases the very evils which it would redress or avert; for it petrifies science into the mere instrument of human passions instead of rendering it the obedient instrument for the better fulfilment of the duties and destinies of man. Notwithstanding all M. Comte's efforts to awaken a healthier state of feeling, to correct

the greed and egotism of the day, to refine, elevate, and develop the affections, it must paralyze these more and more, for the moral nature of man is not to be found, disciplined, chastened, or ennobled by scientific precepts, or by intellectual deductions. M. Comte recognises the fatal ascendancy which is conceded to intellect in the nineteenth century; he strives manfully to hurl the usurper from the throne; but it must retain the sovereignty of human life and conduct, as long as the intellect is the sole alembic for testing the validity of the rules of human action. From the full comprehension of all science, of all philosophy, of all life, flows necessarily and irresistibly as the tides of the ocean, the conclusion that beyond human speculation, beyond human interpretation, beyond the domain of human reason, lies the absolute, authoritative guide of human thought and conduct, in the will of God, revealed in his Scriptures, or as certainly revealed in those indestructible instincts which are interwoven with the very being of man. We do not object to M. Comte's philosophy because it excludes religion; but we object to it because it fails to attain its own ends, because it vainly attempts to accomplish those things which religion does and alone can accomplish, because it does itself reveal the absolute necessity of religion for the attainment of its own ends, and hence proves its exclusion of religion to be a fatal defect.

We do not think that any of the professed followers of M. Comte can admire his genius and learning, the ponderous strength of his intellectual powers, their graceful and easy play, his fearlessness, sincerity, and simplicity more highly than we do, nor appreciate more cordially, nor accept more gratefully his philosophy so far as it is correct and applicable; but the maintenance to the end of that logical consistency, with which his scheme is concatenated, must have shown him the defect in his fundamental position and led to its correction, if his ultra St. Simonism had not rendered the denial of God and the negation of religion immutable assumptions. Yet, this is the blunder which has deprived M. Comte of the highest crown of intellectual greatness. We admit him to be second only to Bacon and Aristotle among the mighty intellects of all time: had he as rigidly incorporated religious faith into his system, as he has strictly excluded it; had he shown its indissoluble connexion and perfect harmony with all knowledge, scientific or other, instead of endeavouring to show, which he has not succeeded in doing, its absolute antagonism to science, we should then have hailed in him one greater than Bacon, for he would have infallibly furnished the solution required for the intellectual and social difficulties of the times.

Comte's Positive Philosophy is the last word of modern infidelity—its highest, most complete, and philosophic expression; it is the most undiluted development of the material, money-seeking, selfish and self-sufficient tendencies of the late centuries. A disposition to reject all restraint, to acknowledge no authority but individual passion or interest, to recognise the *summum bonum* in individual gratifications, to bow to no sovereign but human reason, and to adore human intellect with a base and beggarly worship, as corrupting as it is blind, has become the main characteristic of this nineteenth century, and has matured in anarchy, revolution, and social distress, its fatal fruits.* These tendencies have at length crystallized themselves into a brilliant system in the Positive Philosophy; but its brilliancy is death—it is the annihilating stroke of the lightning which gleams before our eyes, and dazzles us with its fatal beauty. Let us hope that the last revelation of the philosophy of this world may be a sign of the coming advent of a better, as the plagues of Egypt heralded the exodus of the Israelites.

ART. II.—ROGER WILLIAMS.

1. *Memoir of Roger Williams, the Founder of the State of Rhode Island.* By JAMES D. KNOWLES, Professor of Pastoral Duties in the Newton Theological Institution. Boston: Lincoln, Edmonds & Co.
2. *Life of Roger Williams.* By WILLIAM GAMMELL. Boston: Charles C. Little & James Brown.

MR. KNOWLES has done the cause of morals and religion valuable service in rescuing from oblivion many important facts, throwing light upon the true character of Roger Williams. Several attempts had been previously made to accomplish this work, but they had all failed. Dr. Belknap designed to give the life of Roger Williams a place in his American Biography, and he sought earnestly for materials, but with indifferent success. It was announced, a few years since, that Southey intended to write the life of Roger Williams; the design was pro-

* The aims and tendencies of the civilization of the age have been so admirably expressed in a few brief formulae by Hoené Wronski, (*Messianisme*, tome i, pp. 47–49,) that we would have willingly inserted them here, had not our remarks run to such a length that we have been obliged to omit many topics of more importance. One expression has so pointed an application to the Positive Philosophy, as to indicate that the statement was intended as a criticism upon it, and it may certainly be regarded in that light, as a most forcible and just exposition of the fatal creed which must spring from the adoption of the Positivism of M. Comte.

bably relinquished for the same reason. At Southey's suggestion the Rev. Mr. Greenwood, of Boston, collected many valuable materials, but he, too, for personal reasons, abandoned the undertaking. The task of our author was a most difficult one. After receiving all the materials previously collected by Mr. Greenwood, he says, "In my further search for information, I soon discovered, that many persons, well acquainted with our early history, knew very little of Roger Williams. In the books I found almost every important fact concerning him stated differently. I was obliged to gather hints from disconnected documents, and to reconcile contradictory assertions;—my labour often resembled the miner, who sifts large masses of sand, to obtain a few particles of gold." But, difficult as was the task, he has performed it well.

Mr. Gammell's life of Roger Williams presents a truthful and striking portrait of the justly styled "apostle of religious liberty." He relies principally on the facts furnished by Mr. Knowles, and has used them with great skill and advantage. His work is unquestionably one of the most interesting biographies to be found in "Sparks's Library," of which it forms the fourth volume.

In attempting a brief sketch of the life, character, and career of the founder of Rhode Island, we shall make free use of the volumes before us.

But little is known respecting the early life of Roger Williams. From the best information received, it is supposed that he was born in Wales, in 1599. He possessed the Welsh temperament—excitable and ardent feelings, generosity, courage, and firmness. It is supposed that he was a distant relative of Oliver Cromwell—perhaps second cousin. Mr. Williams does not claim in his writings such relationship with the Protector, though he often speaks of being intimate with him. They seemed to have been kindred spirits, whose hearts beat in unison on those great principles which they labored so ardently to promote. Roger speaks of a "close conference with Oliver," on the subject of Popery, which, it is said, they both abhorred and feared. How much they may have assisted each other by their frequent and "close" conferences in the great work to which they seemed to have been providentially called, will not be known before the great day of final accounts.

He became a Christian in early life, though the exact time of his experiencing regenerating grace is unknown. Near the close of life, he observes,—"From my childhood, now above threescore years, the Father of lights and mercies touched my soul with a love to himself, to his only-begotten, the true Lord Jesus, and to his Holy Scriptures." "The religious character, whose germs were thus early

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